



Designation: C 1318 – 95

Standard Test Method for Determination of Total Neutralizing Capability and Dissolved Calcium and Magnesium Oxide in Lime for Flue Gas Desulfurization (FGD)¹

This standard is issued under the fixed designation C 1318; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers analysis of magnesian, dolomitic and high-calcium limes for total neutralizing capability and dissolved major oxides. Dissolved calcium and magnesium are the major species that neutralize acid under the conditions of the test.

1.2 The test conditions are chosen to measure the acid-neutralizing capacity of both calcium hydroxide and magnesium hydroxide contained in slaked lime. By controlling the neutralization pH at 6, magnesium hydroxide and magnesium oxide are titrated in addition to calcium hydroxide fraction.

1.3 This test method also determines the fraction of Mg ions present in the lime that will dissolve under lime flue gas desulfurization (FGD) conditions. Because the Mg^{++} ion alters FGD performance, it is important to know its concentration.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

C 25 Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime²

C 50 Practice for Sampling, Inspection, Packing and Marking of Lime and Limestone Products²

C 51 Terminology Relating to Lime and Limestone (as Used by the Industry)²

3. Terminology

3.1 *Definitions*—Unless otherwise specified, for definitions of terms used in these test methods refer to Terminology C 51.

4. Summary of Test Method

4.1 Lime is slaked by boiling and is reacted with acid at a pH and residence time similar to those found in full-scale FGD reaction tanks.

4.2 A sample of lime is titrated with 1N hydrochloric acid, maintaining a pH of 6 for 30 min. After 30 min, the acid consumption is recorded. The total neutralizing capacity is calculated from the acid consumption and reported as CaO. Dissolved magnesium is determined by atomic absorption spectrometry or by EDTA titration and reported as percent dissolved Magnesium Oxide (as MgO).

5. Significance and Use

5.1 There are existing lime-based flue gas desulfurization units in operation that require a method to measure the oxides available for sulfur dioxide absorption. Dissolved magnesium oxide varies among limes depending on the limestone sources and calcination conditions.

6. Interferences

6.1 Any substance reacting with acid under the conditions of the test will contribute to the total oxide and dissolved oxide values.

6.2 Magnesium in forms other than MgO, which dissolve under test conditions, may affect the dissolved MgO and total oxide value.

7. Apparatus

7.1 *Digital Readout pH Meter*, with combination electrode readable to 0.01 pH units, or an autotitrator with an automatic temperature compensator capable of titrating to a preset endpoint (Note 1).

NOTE 1—Use of an automatic titrator is recommended.

7.2 *Stirrers and Stir Bars*.

7.3 *Atomic Absorption Spectrometer*, if not using EDTA titration.

7.4 *Filtering Funnel*, Type AE glass fiber paper, volumetric flasks (size as needed), 500 mL volumetric flasks, and various Class A pipettes.

8. Reagents

8.1 *1.0 Normal Hydrochloric Acid*, standardize using procedures in Test Methods C 25, Section 28.

¹ This test method is under the jurisdiction of ASTM Committee C-7 on Lime and is the direct responsibility of Subcommittee C07.05 on Chemical Tests.

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² *Annual Book of ASTM Standards*, Vol 04.01.